

CONTROLLED UNCLASSIFIED INFORMATION
SECTION 26 3613

December 27, 2016
STATIC TRANSFER SWITCHES

EQUIPMENT SPECIFICATIONS

SECTION 26 3613 – STATIC TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract.

1.2 SUMMARY

- A. Section includes static transfer switches rated 600 V and less, consisting of solid-state, multi-pole, dual-position switching scheme for automatic transfer from dual sources without interruption of power to downstream load(s).

1.3 DEFINITIONS

- A. MCSW – Molded Case Switch.
- B. SCR – Silicon Controller Rectifier.
- C. STS – Static Transfer Switch.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
 - 1. Single-Line Diagram: Show connections between transfer switch, bypass/isolation switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.

1.5 INFORMATIONAL SUBMITTALS.

- A. Qualification Data: For manufacturer and testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. " include the following:

1. Features and operating sequences, both automatic and manual.
2. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.
- B. Source Limitations: Obtain bypass/isolation transfer switches through one source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NEMA ICS 1.
- E. Comply with NFPA 70.
- F. Comply with NFPA 99.
- G. Comply with NFPA 110.
- H. Comply with UL 1008 standards.
- I. Comply with ANSI C62.41 / IEEE 587.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. Liebert; Emerson Power Network.
 2. MGE (or APC); Divisions of Schneider Electric.
 3. Powerware; Eaton Corporation.
 4. Zenith; General Electric.
 5. Or approved equal.

2.2 GENERAL PRODUCT REQUIREMENTS

- A. Description: The static transfer switch shall be a three-pole, two-position, solid-state, transfer switch that is fed from two AC power input sources, and designed to automatically or manually transfer a load between the two synchronized power sources. One source shall be designated as

the preferred source, while the other source is considered the alternate source. Transfers shall be fast-action, break-before-make type with no simultaneous overlap between input sources.

B. Construction:

1. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 - a. Fully rated, disc-type SCRs (Silicon Controlled Rectifiers) connected in an AC switch arrangement.
 - b. Logic to control switching and sensing functions.
 - c. Fuseless construction: Use of fuses is not permitted due to potential for fuse clearing in an out of phase transfer.
2. Enclosure: Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.
 - a. Front- and Side-Accessible. Note: Equipment will not have rear access due to space constraints.
3. All wiring and cables shall be copper or plated copper. Aluminum shall be used for heat sinks only. All bus shall be rated per the UL or National Electric Code.

C. Design Requirements:

1. Voltage: 480-volts, three-phase, 60 Hz, 3-wire plus ground.
2. Voltage Range: Plus 10-percent to minus 10-percent of nominal.
3. Output Load Capacity: Continuous rated current to carry 100% full load, as indicated or scheduled on drawings.
4. Sensing and Transfer Time: 4-ms (milliseconds) or less under normal in-phase transfer conditions.
5. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
6. Short-Circuit Withstand Current Rating: Minimum 65,000 amperes interrupting capacity.
7. Overload Capability: Unit shall be capable of withstanding an overload condition as follows (minimum requirements):
 - a. 125% for 30-minutes;
 - b. 150% for 1-minute;
 - c. 200% for 30-seconds;
 - d. 500% for 10-seconds.
8. Reliability: Static switch elements shall have a mean time before failure (MTBF) exceeding 1,000,000 hours.
9. Availability: Redundant circuits and components should be utilized where feasible to eliminate single points of system failure. Components include, but are not limited to:

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- a. Power Supply
 - b. Logic Controller
 - c. Internal Bus
 - d. Fans
- D. Equipment Cooling:
 1. Units shall utilize convection cooling with forced-air and dual-redundant fans.
 2. No special filtration shall be required.
- E. Performance Requirements:
 1. Transfers shall be fast-action type; having less than 1/4 –cycle (4ms) interruption in power to the load.
- F. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.
- G. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations.
 1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
 2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top or bottom entrance of feeder conductors as indicated.
 3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
- H. Graphic Interface: Backlit LED or LCD screen for Graphical User interface displaying features such as, but not limited to, status of equipment and system, component position, mimic bus configuration, power monitoring characteristics, and operation.
 1. System settings shall be accessible via interface.
 2. Interface shall allow for operator control of the following:
 - a. Automatic or override selection
 - b. Alarm Silence
 - c. Retransfer disable
 - d. Source selection
 - e. Preferred source selection
 3. Alarm messages shall be displayed including those listed in alarm section below.
- I. Alarms: The alarm circuit shall continue to monitor the following events for each source and system as a whole:

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1. Source Out-of-Tolerance
2. Source Circuit Breaker position
3. Source SCR condition
4. Source over-/under-voltage
5. Source over-/under-frequency
6. Output over-/under-voltage.
7. Control power
8. Power supply failure
9. Bypass Circuit Breaker position

2.3 SYSTEM BYPASS/ISOLATION

- A. Description: Manual type source bypass and isolation configuration; arranged to select and connect either source of power directly to load; isolating transfer switch from load and from both power sources. Include the following features for each static transfer switch:
1. Manual transfer with key-interlocked bypass molded case switches. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. While isolated, interlocks prevent transfer-switch operation, except for testing or maintenance.
 2. Key-interlocks shall be provided for the molded case switches to prevent the operator from closing both the bypass non-automatic breakers at the same time.
 3. Transfer from static mode to bypass mode, on the same source, and retransfer back to static mode shall be transparent to the load.
- B. Interconnection of Bypass/Isolation Switches with Static Transfer Switches: Factory-installed copper bus bars; plated at connection points and braced for the indicated available short-circuit current.

2.4 MODES OF OPERATION

- A. Normal Mode: The unit is fed by two sources with the output connected to the load. In normal operation, the load shall be connected to the preferred source as long as all phases of the preferred source are within the acceptable limits. Upon failure of the preferred source, the load shall be transferred to the alternate source until such time as the preferred source returns to within the acceptable limits.
- B. Automatic Transfer: Automatic retransfer to the preferred source can be disabled if so selected from the operator control panel. When the automatic retransfer is disabled, transfers from the alternate source to the preferred source shall not be disabled when alternate source fails.
- C. Manual Transfer: The static transfer switch shall allow manual (override) initiated transfers between the two sources, providing the alternate source is within acceptable voltage limits and phase tolerances with the preferred source.

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- D. Load Current Inhibit: - If the load current exceeds an adjustable preset level, factory set at two times full rating, due to fault condition, the logic shall disable transfer even if the voltage on the selected source exceeds the transfer limits. The load current transfer inhibit may be automatically or manually reset after the current returns to normal to allow for continued protection against a source failure.
- E. SCR Failure - The static transfer switch shall continuously monitor the status of the SCR. If a shorted SCR on the source powering the load is shorted, the logic shall automatically alarm and trip open the other source input breaker.
- F. Maintenance Bypass: The static transfer switch shall be furnished with key-interlocked maintenance bypass breakers that allow the unit power, controls, and monitoring electronics to be bypassed to either input source for maintenance without interruption of power to the load.

2.5 SOURCE QUALITY CONTROL

- A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Government's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

END OF SECTION 26 3613